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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/645,681	08/21/2003	Tzu-Ching Tsai	10112791	8287
34283	7590	04/29/2004	EXAMINER	
QUINTERO LAW OFFICE 1617 BROADWAY, 3RD FLOOR SANTA MONICA, CA 90404			NHU, DAVID	
			ART UNIT	PAPER NUMBER
			2818	
DATE MAILED: 04/29/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/645,681	<b>Applicant(s)</b> TSAI ET AL.	
	<b>Examiner</b> David Nhu	<b>Art Unit</b> 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 August 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.



**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTIONS

### ***Specifications***

1. Page 7, there is no description of figure 1. where is it?

### ***Claim Objection***

2. Claims 1, 14, "**the** sidewall" lacks a clear antecedent basis.

Also, "a upper portion" should be ~~an~~ upper portion—

"a isolated layer" should be ~~an~~ isolated layer--

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Mei (6,232,171 B1).

**Regarding claims 1, 14,** Mei, figures 1-10, and related text on col. 1-10 (figures 1-8), disclose a method for forming bottle-shaped trenches, suitable for use in a DRAM, comprising: providing a substrate 100; forming a hard mask 110 having openings on the substrate; etching the substrate through the openings to form trenches 130 with an upper portion 120' and a lower portion 170; conformally forming an isolated layer 160 in the trenches and on the hard mask; forming a shield layer 160 in the lower portion of the trenches; removing parts of the isolated layer which is not covered by the shield layer to expose the surface of the upper portion of the trenches; forming a protective layer 180 on a

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sidewall of the upper portion of the trenches; removing the shield layer to expose the isolated layer in the lower portion of the trenches; removing the isolated layer to expose the substrate of the lower portion of the trenches; and etching the substrate of the lower portion of the trenches using the protective layer as a mask to form bottle-shaped trenches.

Regarding Claims 9, 23, Mei, also teaches forming a shield layer in the lower portion of the trenches comprising: forming the shield layer to fill the trenches; removing parts of the shield layer in the upper portion of the trenches to leave parts of the shield layer in the lower portion of the trenches; the trenches are etched by an anisotropic etching; the isolated layer is formed by CVD; driving dopants into the substrate by thermal treatment; the protective layer comprises dopants; the hard mask comprises nitride; the isolated layer comprises oxide.

### **Conclusion**

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Ohtsuki'226, Rajeevakumar'816, Furukawa'988, Divakaruni'686, Leung'008, Lin'757, are cited as of interest.


6. A shortened statutory period for response to this action is set to expired 3 (three) months and 0 (zero) day from the date of this letter. Failure to respond within the period for response will cause the application to become abandoned see 710.02 (b)).

7. Any inquiry concerning this communication on earlier communications from the examiner should be directed to David Nhu, (571)272-1792. The examiner can normally be reached on Monday-Friday from 7:30 AM to 5:00 PM. The examiner's supervisor, David Nelms can be reached on (571)272-1787.

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*The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.*

*Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956*

David Nhu 

May 15, 2003

